AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1-124. (Cancelled).

125. (New) A method of making an oxidation resistant, cross-linked polymeric blend comprising:

a) mixing a polymeric material with one or more additives to form a polymeric blend;

b) consolidating the polymeric blend;

c) irradiating the polymeric blend by ionizing radiation, thereby forming a cross-linked polymeric blend;

d) mechanically deforming the cross-linked polymeric blend below its melting point, thereby forming a mechanically deformed cross-linked polymeric blend; and

e) annealing the mechanically deformed cross-linked polymeric blend at a temperature that is above or below the melting point, thereby forming an oxidation resistant cross-linked polymeric blend.

126. (New) The method of claim 125 further comprising machining the oxidation resistant cross-linked polymeric blend, thereby forming a medical implant.

127. (New) A medical implant comprising the oxidation resistant cross-linked polymeric blend made according to claim 125.

128. (New) The method of claim 125, wherein the polymeric blend is compression molded to a second material, another piece or a medical implant, thereby forming an interface or an interlocked hybrid material.

129. (New) The method of claim 125, wherein the polymeric material is a polyolefin, a polypropylene, a polyamide, a polyether ketone, or a mixture thereof.

130. (New) The method of claim 129, wherein polyolefin is selected from a group consisting of a low-density polyethylene, high-density polyethylene, linear low-

density polyethylene, ultra-high molecular weight polyethylene (UHMWPE), or a mixture thereof.

131. (New) The method of claim 125, wherein the polymeric material is polymeric resin powder, polymeric flakes, polymeric particles, or a mixture thereof or an additive.

132. (New) The method of claim 125, wherein the radiation dose is between about 25 and about 1000 kGy.

133. (New) The method of claim 125, wherein the radiation dose is about 65 kGy, about 75 kGy, about 150 kGy or about 200 kGy.

134. (New) The method of claim 125, wherein the radiation is a gamma irradiation.

135. (New) The method of claim 125, wherein the radiation is an electron beam irradiation.

136. (New) The method of claim 125, wherein the polymeric material is compression molded to another piece or a medical implant prior to heating the polymeric material, thereby forming an interface or an interlocked hybrid material.

137. (New) The method of claim 126, wherein the medical implant is packaged and sterilized by ionizing radiation or gas sterilization, thereby forming a sterile medical implant.

138. (New) The method of claim 125 further comprising:

a) doping the cross-linked polymeric blend with an antioxidant by diffusion, thereby forming an antioxidant-doped cross-linked polymeric blend; and

b) annealing the antioxidant-doped, cross-linked polymeric blend at a temperature below the melting point of the antioxidant-doped, cross-linked polymeric blend, thereby forming a cross-linked, oxidation resistant and homogenized polymeric blend.

139. (New) The method of claim 125 further comprising:

a) machining the oxidation resistant cross-linked polymeric blend, thereby forming an oxidation resistant cross-linked medical implant;

b) doping the oxidation resistant cross-linked medical implant with an additive by diffusion, thereby forming an additive-doped oxidation resistant cross-linked medical implant; and

c) annealing the additive-doped polymeric blend at a temperature below the melting point of the additive-doped polymeric blend, thereby forming a medical implant comprising an additive-doped and homogenized polymeric blend.

140. (New) The method of claim 125, wherein the polymeric material is irradiated at a temperature between about room temperature and about the peak melting temperature of the polymeric blend.

141. (New) The method of claim 125, wherein the polymeric blend is irradiated at a temperature above the peak melting point of the polymeric blend.

142. (New) The method of claim 125, wherein at least one additive is an antioxidant.

143. (New) A method of claim 125, wherein at least one additive is vitamin E.

144. (New) The method in claim 125, wherein the additive concentration is about 0.01 wt/wt%, 0.02 wt/wt%, 0.05 wt/wt%, 0.1 wt/wt%, 0.2 wt/wt%, 0.5 wt/wt%, or 1.0 wt/wt%.

145 (New) The method according to claim 125, wherein the polymeric blend contains more than one antioxidant.

146. (New) The method of claim 125, wherein the cross-linked polymeric blend is mechanically deformed at a temperature below the melting point of the cross-linked polymeric blend.

147. (New) The method of claim 126, wherein the medical implant comprises medical devices selected from the group consisting of acetabular liner, shoulder glenoid, patellar component, finger joint component, ankle joint component, elbow joint component, wrist joint component, toe joint component, bipolar hip replacements, tibial knee insert, tibial knee inserts with reinforcing metallic and polyethylene posts, intervertebral discs, sutures, tendons, heart valves, stents, and vascular grafts.

148. (New) The method of claim 125, wherein the annealing is carried out in air for at least for one minute to about 5 hours or more at about 130°C.

149. (New) The method of claim 125, wherein the cross-linked polymeric blend is mechanically deformed uniaxially.

150. (New) The method of claim 125, wherein the cross-linked polymeric blend is mechanically deformed to a compression ratio of about 2.5 at about 130°C.

151. (New) The method of claim 125, wherein the cross-linked polymeric blend is heated to a temperature between above the room temperature and below the melt, and then mechanically deformed.

152 (New) The method of claim 125, wherein the cross-linked polymeric blend is heated to a temperature of about 130°C, and then mechanically deformed.

153. (New) The method of claim 128, wherein the second material is a porous.

154. (New) The method of claim 128, wherein the second material is metallic.

155. (New) A method of making an oxidation resistant cross-linked blend of polymeric material comprising:

a) blending the polymeric material with one or more additives;

b) consolidating the blend; and

c) irradiating the blend of polymeric material with ionizing radiation at an elevated temperature that is above room temperature and below the melting point of the blend of polymeric material, thereby forming a cross-linked blend of polymeric material.

156. (New) The method of claim 155, wherein at least one of the additives is an antioxidant.

157. (New) The method of claim 155, wherein the polymeric material is a polyolefin, a polypropylene, a polyamide, a polyether ketone, or a mixture thereof.

158. (New) The method of claim 157, wherein polyolefin is selected from a group consisting of a low-density polyethylene, high-density polyethylene, linear low-

density polyethylene, ultra-high molecular weight polyethylene (UHMWPE), or a mixture thereof.

159. (New) The method of claim 155, wherein the polymeric material is irradiated at a temperature between about room temperature and less than about 155°C.

160. (New) The method of claim 155, wherein the blend of polymeric material is irradiated at a temperature of about 90°C.

161. (New) The method of claim 155, wherein the blend of polymeric material is irradiated at a temperature of about 100°C.

162. (New) The method of claim 155, wherein the blend of polymeric material is irradiated at a temperature of about 110°C.

163. (New) The method of claim 155, wherein the blend of polymeric material is irradiated at a temperature of about 120°C.

164. (New) The method of claim 155, wherein the blend of polymeric material is irradiated at a temperature of about 130°C.

165. (New) The method of claim 155, wherein the blend of polymeric material is irradiated at a temperature of about 135°C.

166. (New) The method of claim 155, wherein the irradiation dose is more than 1 kGy to 100 kGy, or more.

167. (New) The method of claim 155, further comprising machining the cross-linked blend of polymeric material, thereby forming a medical implant.

168. (New) The method according to claim 167, wherein the implant comprises medical devices selected from the group consisting of acetabular liner, shoulder glenoid, patellar component, finger joint component, ankle joint component, elbow joint component, wrist joint component, toe joint component, bipolar hip replacements, tibial knee insert, tibial knee inserts with reinforcing metallic and polyethylene posts, intervertebral discs, sutures, tendons, heart valves, stents, and vascular grafts.

169. (New) The method of claim 167, wherein the medical implant is packaged and sterilized by ionizing radiation or gas sterilization, thereby forming a sterile medical implant.

170. (New) A method of making oxidation resistant cross-linked and interlocked hybrid material comprising:

a) blending the polymeric material with one or more additives, thereby forming a polymeric blend;

b) compression molding the polymeric blend to the counterface of a second material, thereby forming an interlocked hybrid material having an interface between the polymeric blend and the second material; and

c) irradiating the interlocked hybrid material with ionizing radiation at an elevated temperature that is above room temperature and below the melting point of the polymeric blend, thereby forming a cross-linked and interlocked hybrid material.

171. (Previously presented) The method of claim 170, wherein the second material is a metallic mesh or back, a non-metallic mesh or back, a tibial tray, a patella tray, or an acetabular shell.

172. (New) The method of claim 170, wherein the polymeric material is a polyolefin, a polypropylene, a polyamide, a polyether ketone, or a mixture thereof.

173. (New) The method of claim 172, wherein polyolefin is selected from a group consisting of a low-density polyethylene, high-density polyethylene, linear low-density polyethylene, ultra-high molecular weight polyethylene (UHMWPE), or a mixture thereof.

174. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature between about room temperature and less than about 155°C.

175. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature of about 90°C.

176. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature of about 100°C.

177. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature of about 110°C.

178. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature of about 120°C.

179. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature of about 130°C.

180. (New) The method of claim 170, wherein the interlocked hybrid material is irradiated at a temperature of about 135°C.

181. (New) The method of claim 170, wherein the irradiation dose is more than 1 kGy to 100 kGy, or more.

182. (New) The method of claim 170, further comprising machining the cross-linked interlocked hybrid material, thereby forming a medical implant.

183. (New) The method of claim 182, wherein the implant comprises medical devices selected from the group consisting of acetabular liner, shoulder glenoid, patellar component, finger joint component, ankle joint component, elbow joint component, wrist joint component, toe joint component, bipolar hip replacements, tibial knee insert, tibial knee inserts with reinforcing metallic and polyethylene posts, intervertebral discs, sutures, tendons, heart valves, stents, and vascular grafts.

184. (New) The method of claim 170, wherein the second material is a porous.

185. (New) The method of claim 170, wherein the second material is metallic.

186. (New) The method of claim 182, wherein the medical implant is packaged and sterilized by ionizing radiation or gas sterilization, thereby forming a sterile medical implant.